

SEQUENCE LISTING

<110> GSF - Forschungszentrum für Umwelt und Gesundheit GmbH

<120> Retroviral expression vectors on the basis of
HERV-LTR-sequences

<130> P12088

<140> PCT/EP00/02064

<141> 2000-03-09

<150> DE 199 10 650.9

<151> 1999-03-10

<160> 47

<170> PatentIn Ver. 2.1

<210> 1

<211> 375

<212> DNA

<213> Human endogenous retrovirus

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 <213> Human endogenous retrovirus

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<400> 8

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<210> 9

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<213> Human endogenous retrovirus

<400> 9

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<210> 10

<211> 314

<212> DNA

<213> Human endogenous retrovirus

<400> 10

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attccaccat tgtgatttgg tctgcccc aactaactga taccatatac tcttcccccg 180
cccttgagaa tgtactttgt acacctatcc caaacctata agaactaatg ataatccac 240
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<210> 11

<211> 309

<212> DNA

<213> Human endogenous retrovirus

<400> 11

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<210> 12

<211> 314

<212> DNA

<213> Human endogenous retrovirus

<400> 12

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attccaccat tgtgatttgg tctgccccta cgctagctga taccatatac tcttcccccg 180

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<210> 13
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 <212> DNA
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<400> 13
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<210> 14
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<400> 14
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 <212> DNA
 <213> Human endogenous retrovirus

<400> 15
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 <212> DNA
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 ggatataaac tcaggcattc aagccagcaa tggctacca ctttgggtcc cctcccatct 300
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<210> 17
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<212> DNA

<213> Human endogenous retrovirus

<400> 17

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ggatataaac tcaggcattc aagccagcaa tggctaccca ctttgggtcc cctccattt 300
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<210> 18

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 18

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gaggtaaaga agtagccaat catctatcgc ctgagagcac aacaggaggg acaatgatca 240
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<210> 19

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 19

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ggatataaac ccaggcattc aagccagcgg tggctaccct ctttgggtcc cctccctttg 300
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<210> 20

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 20

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ggatataaac ccaagcattc gagccagcaa tggctaccct ctttgtgtcc cctccctttg 300
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<210> 21

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 21

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 ggatataaac tcaggcattc aagccagcaa tggctaccca ctttgggtcc cctcccattt 300
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<210> 22

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 22

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<210> 23

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 23

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<210> 24

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 24

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<210> 25

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 25

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<210> 26

<211> 343

<212> DNA

<213> Human endogenous retrovirus

<400> 26

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<210> 27

<211> 619

<212> DNA

<213> Human endogenous retrovirus

<400> 27

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<210> 28

<211> 620

<212> DNA

<213> Human endogenous retrovirus

<400> 28

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<210> 29

<211> 624

<212> DNA

<213> Human endogenous retrovirus

<400> 29

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gccttccgca gtttttgtgt cctgggtact tgagattagg gagtgggtgat gactcttaag 360
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<210> 30
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 <212> DNA
 <213> Human endogenous retrovirus

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gagcatgctg cttcaagca tctgtttaac aaagcacatc ctgcaccgcc cttaatccat 420
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<210> 31
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 <212> DNA
 <213> Human endogenous retrovirus

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<400> 31
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gttttatacc gagacattcc attgccagg gacaggcagg agacagatgc cttcctcttg 120
tctcaactgc aagaggcatt cttcctctt atactaatcc tcctcagcac agacccttta 180
cggtgtcgg gctgggggac ggtcaggctt tcccttccc acgaggccat atttcagact 240
atcacatggg gagaaacctt ggacaatacc tggctttcct aggagagggt ccctgcggcc 300
ttccgcagtt tttgtgtcct gggtacttga gattagggag tggtagtgac tcttaaggag 360
catgtgcct tcaagcatct gtttaacaag gcacatcctg caccgccctt aatccattca 420
accctgagtt gacacagcac acgtttcaga gagcacgggg ttgggggtaaa ggtcatagat 480
taacagaatc tcaaggcaga agaatttttc ttaacacata acaaaatgga gtctcccatg 540
tctacttctt tctacacaga cacagtaaca atctgatccc tcttgctttt cccacattt 600
cccccttttc ttatccatca cactggcggc cgctcgagca tgcattctaga gggcccaatt 660
cgccctatag tg                                672
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<210> 32
 <211> 593
 <212> DNA
 <213> Human endogenous retrovirus

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<400> 32
agtagatgga gcataacaac gggttttata ccgagacatt ccattgcccga gggacaggca 60
ggagacagat gccttcctct tgtctcaact gcaagaggca ttccttcctc ttttactaat 120
cctcctcagc acagaccctt tacagggtgc gggctggggg acggtcagggt ctttcccttc 180
ccacgaggcc atatttcaga ctatcacatg gggagaaaacc ttggacaata cctggctttc 240
ctaggcagag gtcctgctcg ccttctgcag tttttgtgtc cctgggtact tgagattagg 300
gagtggatgat gactcttaag gagcatgctg ctttcaagca tctgtttaac aaagcacatc 360
ctgcaccgcc cttaatccat tcaaccctga gttgacacag cacatgtttc agagagcacg 420
gggttggggg taaggtcata gattaacaga atctcaaggc agaagaattt ttcttagcac 480
ataacaaaat ggagtcctct atgtctactt ctttctacac agacacagta acaatttgat 540
ctctcttgct tttccccaca tttccccctt ttcttttcga caaaaccgcc atc                                593
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<210> 33
 <211> 943
 <212> DNA
 <213> Human endogenous retrovirus

<400> 33
 tgtgggcgaa ggattaccca ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60
 ataatataga aaatagctag aataagaata gttataataa aaattagata tacacatgat 120
 catggacatt accaatcatt actacaaaca ttgttaataca ttagctttta atattactct 180
 ttgttttatt actaatataa ccaaggaata accggtagca tacggtcagg tgctgaaggg 240
 acattgtgag aagtgacctga gaaggcaaga ggtgagcctt ctgtcacgcc tgcataagga 300
 cagcttgagg gctccttggt caagctgtaa caccagtgc tgggaaggca ccgttactta 360
 gcagaccatg aaagggagtc tccattcctt ggaggagtca gggaaacact atgctccacc 420
 agcttcttgt gtatccagcc ctgccacag tcatccagag gcataaaccc ctccctgtgg 480
 tgctgtgctt caatggccat gcttcttgct cactttcatg ttctctctgt actcctgggt 540
 cctctttgaa gtctgtagaa gataatggta gaagaaatag tgaaagtctt tgatctttct 600
 tataagtga tagaagaaaa cactgatgta tgctgcctt ccctctctgc ttcagctacc 660
 taaaaggaaa ggccccctt cccatgatca catgacttgc ctgaccttat caatcacttg 720
 gaggactcac cctccttacc ctgtccctt gtcttgtatg caataaatat cagcacgccc 780
 agccattcgg ggccactact ggtctccgca acttggtggt agtggtacct tgggcccagc 840
 tgttttctct ttatctctt tgtcttgtgt ctttatttct tacaatctct catctctgca 900
 catggggaga acaccggcaa agcccgtagg gctggacctt aca 943

<210> 34
 <211> 389
 <212> DNA
 <213> Human endogenous retrovirus

<400> 34
 aaacccctcc ctgtggtgct gtgcttcaat ggccatgctt cttgtccact ttcattgttcc 60
 tcctgtactc ctgggttctc tttgaagtc gtagaagata atggtagaag aaatagtgaa 120
 agtctttgat ctttcttata agtgcataga agaaaacact gatgtatgcc tgccttccct 180
 ctctgcttca gctacctaaa aggaaaggcc ccctttccca tgatcacatg acttgctga 240
 ccttatcaat cacttgagg actcaccctc cttaccctgt ccctttgtct tgtatgcaat 300
 aaatatcagc acgcccagcc attcggggcc actactggtc tccgcaactt ggtggtagt 360
 gtaccctggg cccagctgtt ttctcttta 389

<210> 35
 <211> 858
 <212> DNA
 <213> Human endogenous retrovirus

<400> 35
 tgtgggcgga agagtaccta ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60
 ataataaaga aaatagaata agaatagtca taatacaaat tagatacagc gatgatcatg 120
 aacaattatc catcattatt ataaacatta ttaatcatta gcttttaata ttactctgtt 180
 gcattaataa tataacctag gaataaccgg caggtatagg gtcaggtgct gaaggacat 240
 tgtgagaagt gaatagaagg caagagggga gccttctgtc atgcccgat aaggcccgct 300
 tgaggggccc ttggtcaagc ggtaacgcca gtgtctggga aggcaccctg tactgagcag 360
 accgggaaag ggagtctcct ttcttggag gagtcaggga acgctctgct ccaccagctt 420
 cttgtgggag gctggatgtt acccaggcct gcctgcagtc atccggaggc ctgaaccctt 480
 ccctgtggtg cttcaatggt caggttccct gtccactttc atgctccttc cgtactcctg 540
 gttcctcttt gaagtctgta gtagatagcg gtagaagaaa tagtgaaagt cttaaagtct 600
 ttgatcttat aagttcatag aagaaaacgc tgatgcctgc cgccttctct ctctgcttca 660
 gctacctaa aggggaagggc ccgctgtcct gtgatcagg gacttgcttc acctgtgcaa 720
 tcaactagaa gactgacct ccttatectg ccccttctgc ttgtatgcaa taaatatcag 780
 cgagcccagc cgttcagggc cactaccggt ctccgtgtct ttgtggtagt ggtccccggg 840
 cccagctgtt ttctcttt 858

<210> 36

<211> 386
 <212> DNA
 <213> Human endogenous retrovirus

<400> 36
 gaacccctcc ctgtggtgct tcaatggtca cgttccttgt ccactttcat gtccttccg 60
 tactcctggt tcctctttga agttcgtagt agatagcggg agaagaaata gtgaaagtct 120
 taaagtcttt gatcttataa gttcatagaa gaaaacgctg atgcctgccg ccttctctct 180
 ctgcttcagc tacctaagag ggaagggccc gctgtcctgt gatcaggtga cttgcttcac 240
 cttgtcaatc acttagaaga ctgaccctcc ttatcctgcc cccttgtctt gtatgcaata 300
 aatatcagcg agcccagccg ttcagggcca ctaccgggtct ccgtgtcttt gtggtagtgg 360
 tccccgggcc cagctgtttt ctcttt 386

<210> 37
 <211> 844
 <212> DNA
 <213> Human endogenous retrovirus

<400> 37
 tgtgggtgga ggattaccca ggtgcccaagg caagagactg aaggcacaaa ctgtttcagt 60
 ataataaaaa aaatagaata agaatagtca taatacaaat tagatataga gatgatcatg 120
 gacaattagc aatcactatt aatcttttagc ttttaatat actctttggt gcattactaa 180
 tataacctag gaataaccgg tgggtatagg gtcaggtgct gaagggacat tgtgtgaagt 240
 gacctggaag gcaagagggt agccctctgt cagcccccaca taagggccgc ttgagggctc 300
 cttggtcaag tggtaacgcc agtgtctggg aatgcaccgc ttaattagca gaccgcgaaa 360
 gggagtctcc tttccttgga agagtgggg aacactctgc tccaccagct tcttgtggaa 420
 ggctggatat tatccaggcc tgcgcgcagt catccggagg cttaaaccct tccctgtggt 480
 gctgtgcttc aatgggtccca ctccctgtcc actttcatgc tccctccgta ctccgtgttc 540
 ctctttgaag agcgcagtag atagcggtag aagaaatagt gaaagtctta aagtcttcga 600
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 gctacataaa aggggaagggc cgcctatcct gtaatcacat gacttgcttc acctgtcaa 720
 tcacttagaa gattcactct ccttaccctg ccccttgctc ttgtatgcaa taaatatcag 780
 tgacccagc cgttcagggc cactactggt ctccgcgtct tgatggtagt ggtcaccccg 840
 gcc 844

<210> 38
 <211> 381
 <212> DNA
 <213> Human endogenous retrovirus

<400> 38
 aaacccttcc ctgtggtgct gtgcttcaat ggtcccactc cttgtccact ttcagtctcc 60
 tcccgctactc ctggttctctc tttgaagagc gcagtagata gcggtagaag aaatagtga 120
 agtcttaaag tcttcgatct ttcttacaag tgcagagaag aaaacgctga catatgctgc 180
 cttccctctc tgcttcgggt acctaaaagg gaagggccgc ctatcctgta atcacatgac 240
 ttgcttcacc ttgtcaatca cttagaagat tcactctcct taccctgcc ccttgtcttg 300
 tatgcaataa atatcagtga ccccagccgt tcagggccac tactggtctc cgcgtcttga 360
 tggtagtggt caccgccggc c 381

<210> 39
 <211> 859
 <212> DNA
 <213> Human endogenous retrovirus

<400> 39
 tgtgggtgga ggattaccca ggtgcccaagg caagagactg aaggcacaaa ctgtttcagt 60
 ataataaaaa aaatagaata agaatagtca taatacaaat tagatataga gatgatcatg 120
 gacaattagc aatcactatt aatcttttagc ttttaatat actctttggt gcattactaa 180
 tataacctag gaataaccgg tgggtatagg gtcaggtgct gaagggacat tgtgagaagt 240
 gacctggaag gcaagagggt agccctctgt cagcccccaca taagggccgc ttgagggctc 300

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cttgggtcaag tggtaacgcc agtgtctggg aatgcacccg ttaattagca gaccgcgaaa 360
gggagtcctcc tttccttggg agagtgtggg aacactctgc tccaccagct tcttgtggaa 420
ggctggatat tatccaggcc tgcgcgcagt catccggagg cttaaaccct tccctgtggt 480
gctgtgcttc aatgggtccc ctcttgtcc actttcatgc tccctccgta ctctgggtc 540
ctctttgaag agcgcagtag atagcggtag aagaaatagt gaaagtctta aagtcttcga 600
tctttcttac aagtgcagag aagaaaacgc tgacatatgc tgccttcct ctctgcttcg 660
gctacctaaa aggggaagggc cgcctatcct gtaatcacat gacttgcttc acctgtcaa 720
tcacttagaa gattcaccct ccttaccctg ccccttgtc ttgtatgcaa taaatatcag 780
tgaccccgagc cgttcagggc cactactggt ctccgcgtct tgatggtagt ggtcaccccg 840
gccaggtgt tttttcttt 859

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<210> 40
 <211> 396
 <212> DNA
 <213> Human endogenous retrovirus

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<400> 40
aaacccttcc ctgtggtgct gtgcttcaat ggtcccactc cttgtccact ttcattgctcc 60
tcccgtactc ctggttcctc tttgaagagc gcagtagata gcggtagaag aaatagtga 120
agtcttaaag tcttcgatct ttcttacaag tgcagagaag aaaacgctga catatgctgc 180
cttccctcctc tgcttcggct acctaaaagg gaagggccgc ctatcctgta atcacatgac 240
ttgctttacc ttgtcaatca cttagaagat tcacctcct taccctgcc ccttgtcttg 300
tatgcaataa atatcagtga cccagccgt tcagggccac tactggtctc cgcgtcttga 360
tggtagtggg caccgccggc cagggtgttt ttcttt 396

```

<210> 41
 <211> 966
 <212> DNA
 <213> Human endogenous retrovirus

```

<400> 41
tgtgggtgga ggattaccca ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60
ataataaaga aaatgggttag aataagaata gtcataatac aaattagata tagagatgat 120
catggacaat tatcaatcat tattataaac attattaatc attagctttt aatattactc 180
tttgttgcatt tactaatata acctaggaat aaccgggtggg tatagggtca ggtgctgaaa 240
ggacattggg agaagtgacc tagaaggcaa gaggtgagtc ttctgtcacg cccgcataag 300
ggttgcttga gggctccttg gtcaagtggg aacgccggtg tctgggaagg cacctgttac 360
ttagccgacc acgaaaggga gtctcctttc cttggaggag tcagggcgca ctctgctcca 420
ccagcttctt gtggaaggct ggatattatc caggcctgcc cgcagtcac cggaggccta 480
aaccctcccc tgtggtgctg tgcttcaatg ggcacactcc tcgtccactt tcatgttctc 540
cccatactcc tggtttctct ttgaagttcg tagtagatag tggtagaagg aatagggaaa 600
atcttaaagt gtttgatctt tcttataagt gcatagaaga aaacgctgac atatgctgcc 660
ttctctgtct gcttcagcta cctaagaggg aagggccccc tgtccagtga tcacgtgact 720
tgcttcacct tgtcaatcac ttagaagatt caccctcctt accctgcccc cttgtcttgt 780
atgcaataaa tatcagtga cccagccttt cggggccact taccggtctc cacgtcttgg 840
tggtagtggg ccccggggcc cagctgtttt ctctttatct ctttgtcttg tgtcttattt 900
attacaatct ctgctctccg cacacaggga gaacaccgc taagctccgt agggctggac 960
cctaca 966

```

<210> 42
 <211> 398
 <212> DNA
 <213> Human endogenous retrovirus

```

<400> 42
aaacccttcc ctgtggtgct gtgcttcaat gggcacactc ctggtccact ttcattgttc 60
tcccatactc ctggtttctc tttgaagttc gtagtagata gtggtagaag gaataggaa 120
aatcttaaag tgtttgatct ttcttataag tgcataagaag aaaacgctga catatgctgc 180
cttctctgtc tgcttcagct acctaagagg gaagggcccc ctgtccagtg atcacgtgac 240
ttgcttcacc ttgtcaatca cttagaagat tcacctcct taccctgcc ccttgtcttg 300

```

tatgcaataa atatcagtgcc acccagcctt tcggggccac ttaccgggtct ccacgtcttg 360
gtggtagtggt tcccccggtc ccagctgttt tctcttta 398

<210> 43

<211> 938

<212> DNA

<213> Human endogenous retrovirus

<400> 43

tgtgggtgga ggattaccca ggtgccgagg caagagactg aaggcacaac ctgtttcagt 60
ataataaaga aaatgggttag aataagaata gtcataatac aaattagata tagagatgat 120
catggacaat tatcaatcat tattataaac attattaatc attagctttt aatattactc 180
tttgttgcac tactaatata acctaggaat aaccgggtggg tataggggtca ggtgctgaag 240
ggacattggg agaagtgacc tagaaggcaa gaggtgagtc ttctgtcacg cccgcataag 300
ggttgcttga gggctccttg gtcaagtggg aacgccgggtg tctgggaagg cacctgttac 360
ttagccgacc acgaaaggga gtctcctttc cttggaggag tcagggcaca ctctgctcca 420
ccagcttctt gtggaagggt ggatattatc caggcctgcc cgcagtcacg cggaggccta 480
aaccctctcc tgtgggtgctg tgcttcaatg ggcacactcc tcgtccactt tcatgttctc 540
cccatactcc tgggttcctct ttgaagttcg tagtagatag tggtagaagg aatagggaag 600
atcttaaaagt gtttgatctt tcttataagt gcatagaaga aaacgctgac atagtctgcc 660
ttctctgtct gcttcagcta cctaagaggg aaggggcccc tgtccagtga tcacgtgact 720
tgcttcacct tgtcaatcac ttagaagatt caccctcctt accctgcccc cttgtcttgt 780
atgcaataaa tatcagtgca cccagccttt cggkkcactt accggtctcc acgtcttggt 840
ggtagtgggt ccccggtccc gctgttttct ctttatctct ttgtcttgtg tcttatttat 900
tacaatctct cgtctccgca cacagggaga acaccgcg 938

<210> 44

<211> 396

<212> DNA

<213> Human endogenous retrovirus

<400> 44

aaaccctctc ctgtgggtgct gtgcttcaat gggcacactc ctgtccactt tcatgttctc 60
tccatactcc ctgggttcctc ttgaagttc gtagtagata gtggtagaag gaatagggaag 120
aatcttaaaag tgtttgatct ttcttataag tgcatagaag aaaacgctga catatgctgc 180
cttctctgtc tgcttcagct acctaagagg gaagggcccc ctgtccagtg atcacgtgac 240
ttgcttcacc ttgtcaatca cttagaagat tcaccctcct taccctgccc cttgtcttg 300
tatgcaataa atatcagtgcc acccagcctt tcggkkcact taccggtctc cacgtcttggt 360
tggtagtgggt ccccggtccc agctgttttc tcttta 396

<210> 45

<211> 963

<212> DNA

<213> Human endogenous retrovirus

<400> 45

tgtgggcgaa agattaccta ggtgccgagg caagagactg aaggcacaa ctgtttcagt 60
ataataaaga aaatagttta aataagaata gttataatac aaattagata tagagatgat 120
catggacaat tatcaatcat tattataaac attaatcatt agcttttaatt attactcttt 180
gttgctttac taatataacc taggaataac cgggtgggtat agggtcagggt gttgacggga 240
tattgtgaga agtgacctag aaggcaagag gtgagccttc tgtcacgccc acataagggtc 300
cgcttgaggg ctctttgggtc aagtggtaac gccagtgtct gtgaaggcac ctgttactta 360
gcagaccgag aaaggagggtc tcttttcctt ggaggagtca gggaacactc tgcctcacca 420
gcttcttgtg gaaggctgga tattatctag gcctgcccgc agtcatcttg aggcctaaac 480
ccctccctgt ggtgctgtgc ttcatgtgtc actctccttg tccactttca tgttctctcc 540
gtactcctgg ttctcttttg aagttcgtag tagatagcag tagaagaaat agtgaaagtc 600
ttaaagtatt tgatctttct tataagtgca tagaagaaaa cgctgacata tgctgccttc 660
tctatctctg cgggtggctac ctaaaaggga agggccccct gtcccatgat catgtgactt 720
gcttcacctt atcacttaga agattcatcc tcttaccctc gcgccccctc gtcttgtatg 780
caataaatat cagcacgccc agtcgtttga ggccactgcc ggtctccgag tcttggtggt 840

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agtggtcccc cgggccccagc tattgtctct ttatctcttt gtcttgtgtc tttattttatt 900
acaatctctt gtctctgcac acagggagaa cacctgctaa gccccgtagg actggaccct 960
aca                                                    963

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<210> 46
<211> 397
<212> DNA
<213> Human endogenous retrovirus

```

```

<400> 46
aaacccctcc ctgtggtgct gtgcttcagt ggctactctc cttgtccact ttcattgttcc 60
tcccgtactc ctggttctct tttgaagttc gtagtagata gcagtagaag aaatagttaa 120
agtcttaaag tatttgatct ttcttataag tgcatagaag aaaacgctga catatgctgc 180
cttctctatc tctgcggtgg ctacctaaaa gggaagggcc ccctgtccca tgatcatgtg 240
acttgcttca ccttatcact tagaagattc atcctcctta ccctgcgccc cctcgtcttg 300
tatgcaataa atatcagcac gccagtcgt ttgaggccac tgccggtctc cgcgtcttgg 360
tggtagtggc cccccgggcc cagctattgt ctcttta 397

```

```

<210> 47
<211> 489
<212> DNA
<213> Human endogenous retrovirus

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```

<400> 47
tggtcaattc tttgccttct actttttaa c ttaacttct cataaagcaa cctttttcaa 60
tcacctgctc cactctgact cattctgac acctgctcca ccctgactca ttccgatcac 120
ctgatccact gtgactcatt ccgattaccc gctccaccct gactcattct gattctgatt 180
tctgtctctg ccataaccat ttttcccgcc aaaccactca ccctgtcact ctctttaaat 240
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agcagcaggg gccacatgtg tcaggaataa gaccccttcc ccctccctgt ccagatgtgt 360
gctcaccatt gctccatctg tgagggcaca cccttctata gaagtaaatt gccttgctga 420
gaagaaaaaa aagaacattt tatattcaag tcctatttct tttgctgcac cgaaacttta 480
tttataaca 489

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